

REMARKS

Claims 2-9, 11, 12 and 15-22 are pending in the present application.

The indication that claims 2-4, 6-9, 11-12 and 19 are directed to allowable subject matter is greatly appreciated.

The Drawings stand objected to under 37 CFR § 1.83(a).

The Specification stands objected to under MPEP § 608.01(b).

Claims 2-9, 15-17 and 20 stand objected to for various informalities.

Claims 5, 15-18 and 20-22 stand rejected under 35 USC § 112, first paragraph as failing to comply with the enablement requirement.

Claims 6-9, 11-12, 15-17, 19 and 21 stand rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Drawing Objections

The Office Action states that the drawings are objected to because they do not show the system of claims 11-12, 19 and 22.

Applicant respectfully traverses the objection to the drawings. Applicant respectfully submits that one skilled in the art will be enabled to practice the invention as claimed and in light of the specification as filed. Accordingly, it is submitted that the corrected drawing(s) requested by the Office Action are not necessary. Applicant requests reconsideration and withdrawal of the objection to the drawings.

The Specification Objections

The Office Action states that the abstract of the disclosure is objected to and states that “is obtaining” should be “is obtained” and “accurate” should be “accurate”. Applicant appreciates this attention to detail and has amended the abstract to address these typographical informalities. Accordingly, Applicant requests reconsideration and withdrawal of the objection to the specification.

The Claim Objections

The Office Action states that claims 2-9, 15-17 and 20 are objected to in that in claim 2, line 3, “has” should be “is”; in claims 3, 9, 17 and 20, “isocenter” should be “magnetic isocenter” to be consistent with claim 2; claim 8 depends from canceled claim 1; and in claim 15, line 3, “an” should be “a”.

As with the specification, Applicant appreciates this attention to detail and has made the suggested changes as noted in the amendments to the claims listed above. In light of the amendments, Applicant requests reconsideration and withdrawal of these objections to the claims.

Rejections Under § 112, First Paragraph

The Office Action states that claims 5, 15-18 and 20-22 stand rejected under 35 USC § 112, first paragraph as failing to comply with the enablement requirement.

Claim 5 is directed to the method as claimed in claim 2, wherein an optimal Field-of-View (FOV) is determined having geometrical positions with a prescribed accuracy for the target in the first image and the at least one fiducial marker in the second image.

The Office Action states that the specification fails to define “an optimal Field-of-View”.

Applicant respectfully submits that the application as filed would enable one skilled in the art to practice the invention as claimed. More specifically, the specification, at page 5, lines 14-20, teaches by way of a non-limiting example that Fig. 1 depicts the above described situation. Three imaging positions of a large patient 1 having a lesion 2, are schematically shown. The ellipse represents an MR image of a large person 1. On the left side and on the right side of the patient external or fiducial markers 4,5, drawn as small squares, are fixed on the patient 1. These external or fiducial markers can also be fixed on a fixation device. The circle represents the optimal field of view FOV^{opt} 3 wherein the geometrical accuracy of the imaging system is acceptable, i.e. has a prescribed tolerance. In light of at least this disclosure, Applicant respectfully requests reconsideration and withdrawal of the § 112, first paragraph rejection of claim 5.

The foregoing discussion can be applied *mutatis mutandis* to **claims 21 and 22**. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 112, first paragraph rejection of claims 21 and 22.

Claim 15 is directed to a computer program product comprising a computer readable medium in which is embodied a program having instructions executable by a computer to control a magnetic resonance imaging system, comprising instructions to: acquire a first magnetic resonance image of an anatomical target that includes an accurate lower geometric distortion region and a higher geometric distortion region, wherein in the first image, the anatomical target is imaged in the accurate lower geometrical distortion region, and acquire a second magnetic resonance image with at least one fiducial marker located at a shifted position relative to the first magnetic resonance image, wherein in the second image, the at least one fiducial marker is imaged in the accurate lower geometrical distortion region.

The Office Action states that the specification fails to define “lower geometric distortion region” and “higher geometric region”.

Applicant respectfully submits that the application as filed would enable one skilled in the art to practice the invention as claimed. More specifically, the specification discloses, by way of non-limiting example at page 4, line 29 – page 5, line 4, that to reduce the errors due to image distortion, the patient is imaged in two or more positions. First, the patient is imaged with the lesion approximately in the isocenter of the MR system. In these images, some or all markers may be so far from the isocenter, that even with gradient distortion correction, the geometrical position of the markers is measured not accurate enough, i.e. the markers depicted on the original image with the large FOV do not correspond exactly with the real positions of the markers. Thus, the positions of markers (4,5,6,7,8,9,10,11) of the patient 1 are detected incorrectly. In order to correct this mistake, the patient is imaged in at least one additional position, with the patient off-center in such a way that the markers on one side will be closer to the isocenter and therefore can be measured more accurately. In light of at least this disclosure, Applicant respectfully requests reconsideration and withdrawal of the § 112, first paragraph rejection of claim 15.

The foregoing discussion can be applied *mutatis mutandis* to **claims 16-17 and 20**. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the § 112, first paragraph rejection of claims 16-17 and 20.

Claim 18 is directed to a computer program product comprising a computer readable medium in which is embodied a program having instructions executable by a computer to perform the steps of: receiving a first magnetic resonance (MR) image from a MR scanner of an anatomical target of a patient within a field of view (FOV), wherein the anatomical target is imaged at an accurate geometrical position of the FOV, receiving a second magnetic resonance image from the MR scanner of a fiducial marker attached to the patient within the FOV, the second magnetic resonance image being at a shifted position relative to the first magnetic resonance image such that the fiducial marker is imaged at the accurate geometrical position of the FOV, obtaining additional magnetic resonance images of additional fiducial markers within the FOV, the additional magnetic resonance images being at shifted positions relative to the first magnetic resonance image such that the additional fiducial markers are imaged at the accurate geometrical position of the FOV, and merging the accurate geometrical position of the target and the accurate geometrical position of the fiducial markers in a single composite image, the composite image depicting the accurate geometrical positions of the anatomical target and the fiducial markers.

The Office Action states that the specification fails to define “an accurate geometrical position of the FOV.”

Applicant respectfully submits that the application as filed would enable one skilled in the art to practice the invention as claimed. More specifically, and as noted above in connection with claim 15, the specification discloses, by way of non-limiting example that the patient is imaged with the lesion approximately in the isocenter of the MR system. In light of at least this disclosure, Applicant respectfully requests reconsideration and withdrawal of the § 112, first paragraph rejection of claim 18.

Rejections Under § 112, Second Paragraph

Claims 6-9, 11-12, 15-17, 19 and 21 stand rejected under 35 USC § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The Office Action states that “the fiducial markers” in **claims 6-8** lack antecedent basis.

Applicant respectfully submits that claim 2 has been amended to replace “fiducial marker” with “at least one fiducial marker”. In light of this amendment, the antecedent basis issue related to claims 6-8 has been corrected.

The Office Action states that **claim 11** is unclear with respect to the language “at least one fiducial marker is applied to the body of the patient”.

Applicant respectfully submits that claim 11 has been amended pursuant to the suggestion by the Office Action to read “wherein at least one fiducial marker is adapted to be placed on the patient”.

The Office Action states that “anatomical target” in **claim 15** lacks antecedent basis.

Applicant respectfully submits that claim 15 has been amended to change “the anatomical target” to “an anatomical target”.

The Office Action also states that claim 15 fails to disclose merging the obtained first and second MR images, and it therefore incomplete.

Applicant respectfully traverses this rejection and submits that claim 15 is complete in its present form. Should clarification be made as to why not disclosing merging the images renders the claim incomplete, Applicant will certainly address that concern as necessary.

The Office Action states that “said scanner” in **claim 17** lacks antecedent basis.

Applicant respectfully submits that claim 17 has been amended to replace “scanner” with “magnetic resonance imaging system”.

The Office Action also states that “at least one fiducial” is inconsistent with claim 15.

Applicant respectfully submits that claim 15 has been amended to replace “fiducial marker” with “at least one fiducial marker”.

Finally, the Office Action states that the body of **claim 21** fails to disclose planning radiotherapy treatment as set forth in the preamble of claim 21.

Applicant respectfully submits that the preamble of claim 21 has been amended to remove the reference to planning radiotherapy treatments.

In light of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejections under § 112, second paragraph.

CONCLUSION

For the reasons set forth above, it is submitted that **claims 2-9, 11-12, and 15-22** (all claims) distinguish patentably over the references of record and meet all statutory requirements. An early allowance of all claims is requested.

If any extensions of time are necessary in connection with this Amendment B, Applicants hereby petition for such extension. If any fees are due in connection with this Amendment B, the authorization to charge deposit account 14-1270 for the fees associated therewith is hereby provided.

Respectfully submitted,

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